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RELATION BETWEEN THE CONSUMPTION OF ROUND TIMBER AND THE PRODUCTION OF ORE IN THE METAL MINES OF THE NORTHERN ROCKIES

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In 1949 the mining industry extracted 4.8 million tons of metallic ores in the Northern Rockies. Of this total 59 percent was produced in Montana, 33 percent in North Idaho, and 8 percent in Northeast Washington (table 1). Forest products have an important function in mines, being used in varying amounts in the mining process. Round timbers are used in framing mine shafts, drifts, and stopes and to a limited extent in building construction. Sawed products include lagging, planking, timbers, shaft guides, cross ties, and other miscellaneous items. These sawed products are not included in the following data. This report gives the volume of round timber used in mining, and its relation to the tonnage of ore produced. As used in this report the term "round timber" refers to timber utilized in mining which is not squared or sawn into lumber or timber in a sawmill. Logs which are slabbed on not more than two sides are included as round timber.

Table 1. Production of metallic ore and consumption of round timber, 1949

Grouping 1/	Metal ore production		Round timber consumption		
State unit	Thousand tons	Percent of total	Thousand linear ft.	Thousand cubic ft.	Percent of total
Montana	2855	59	4619	2781	70
North Idaho	1622	33	1740	1116	28
Northeast Washington	373	8	151	72	2
Total	4850	100	6510	3969	100
Mine size					
Large	3175	66	4301	2585	65
Medium	1177	24	918	583	15
Small	498	10	1291	801	20
Total	4850	100	6510	3969	100

1/ North Idaho includes that part of Idaho north of the Salmon River and Northeast Washington includes Ferry, Lincoln, Pend Oreille, Spokane, Stevens, and Whitman Counties.

Large mines include those producing 100,000 tons or more annually; medium 10,000 to 99,999 tons; and small less than 10,000 tons.

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Volume and species of timber used in mining. A total of 4.0 million cubic feet of round timber was used in mining in 1949 in the Northern Rockies (table 1). This amounts to nearly 25 million board feet or 6.5 million linear feet. Roughly, almost one cubic foot of round timber is required to produce a ton of ore in the Northern Rockies. No satisfactory substitute for wooden mine timbers has been developed to date.

Douglas-fir is the preferred species in this region because of its desirable strength to weight ratio and its reputed characteristic of giving an audible warning before breaking. In 1949, 59 percent of the round timbers used in mining were Douglas-fir. Lodgepole pine was next in volume, making up 23 percent of the total. Convenient stem size and nearness of lodgepole stands to numerous mines, more than anything else, accounts for its prominent usage in the mines. Larch ranks second in preference to Douglas-fir for mine stulls but was third in volume used. The remaining 18 percent of the total is largely made up of larch. Dead timber, which was all lodgepole pine and used in Montana, comprised 8.3 percent of the total volume consumed. This volume of dead timber is included in the figures in this report.

Ore and timber factors. In determining the volume of timber used in mining, factors relating timber consumption to ore production have been found useful. Such factors have been computed in this analysis and are given in table 2. The correlation between ore tonnage produced and mine timbers used is quite consistent on the average. However, a number of influencing conditions explain the wide differences in factors between the various areas and mine sizes. The higher volume of timber per ton of ore mined in Montana than in the other states is explained largely by the method of mining used in extracting copper ore. In North Idaho, where the principal ores extracted are lead, zinc, and silver, much less timber is used. The low factor for Northeast Washington is explained by much of the ore coming from mines that require no timbering. Small mines use far more round timber than the larger ones which depend more upon sawn timber.

Table 2. Round timber consumption per ton of ore produced, 1949

Grouping	Board feet	Cubic feet	Linear feet
State unit			
Montana	6.079	0.974	1.618
North Idaho	4.220	0.688	1.072
Northeast Washington	1.168	0.194	0.406
Average	5.080	0.818	1.342
Mine size			
Large	5.056	0.814	1.355
Medium	3.020	0.496	0.780
Small	10.097	1.608	2.594
All mines	5.080	0.818	1.342

Purpose and method of making the study. The Forest Survey project periodically determines the total commodity drain from the forest resource. The purpose of this study was to estimate that part of the forest commodity drain used in mining.

To determine the volume of timber used in mining the following method was used. For 1949, the latest year for which ore production data were available, a record of ore production for Montana, North Idaho, and Northeast Washington was obtained from the Bureau of Mines, U. S. Department of Commerce. Individual mines were stratified into three groups, large, medium, and small. All of the large mines were canvassed to obtain the volume of timber they used in mining in 1949. An attempt was made to contact all of the medium mines also, but records were obtained from only 91 percent of the tonnage produced by these mines. On the basis of this 91 percent the total consumption was determined for the medium-size mines by assuming a direct proportion between timber use and ore production for the remaining 9 percent. For the small mines, which reported 10 percent of the total ore production in 1949, a 4-percent random sample was drawn for the region. Reports were mailed to these mines, and when not returned were completed by field follow-up. The 4-percent sample of the small mines was similarly expanded to represent the total round timber consumption for that group of mines. The three stratifications for which timber consumption data were obtained resulted in enumeration of timber consumption by producers of 88 percent of the ore production. An analysis of the data showed that the total volume of timber used in mining in 1949 as determined by the above procedure has a sampling error of ±2.8 percent.